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(54) Rainwater catchment apparatus

(57) Rainwater catchment apparatus including a tank (10) for receiving rainwater from the roof of a building.
The water tank is a closed top tank so that any shortage of rainwater will be made up by mains water, the tank is provided with a float valve (21) the outlet from which is at a point higher than the side walls of the roof guttering.

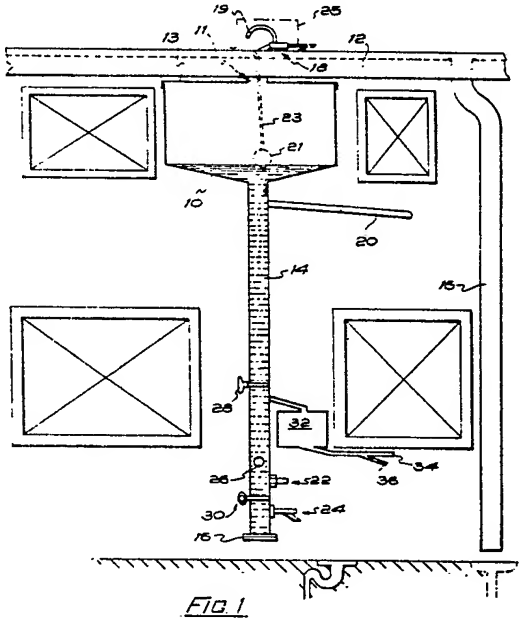

FIG 1

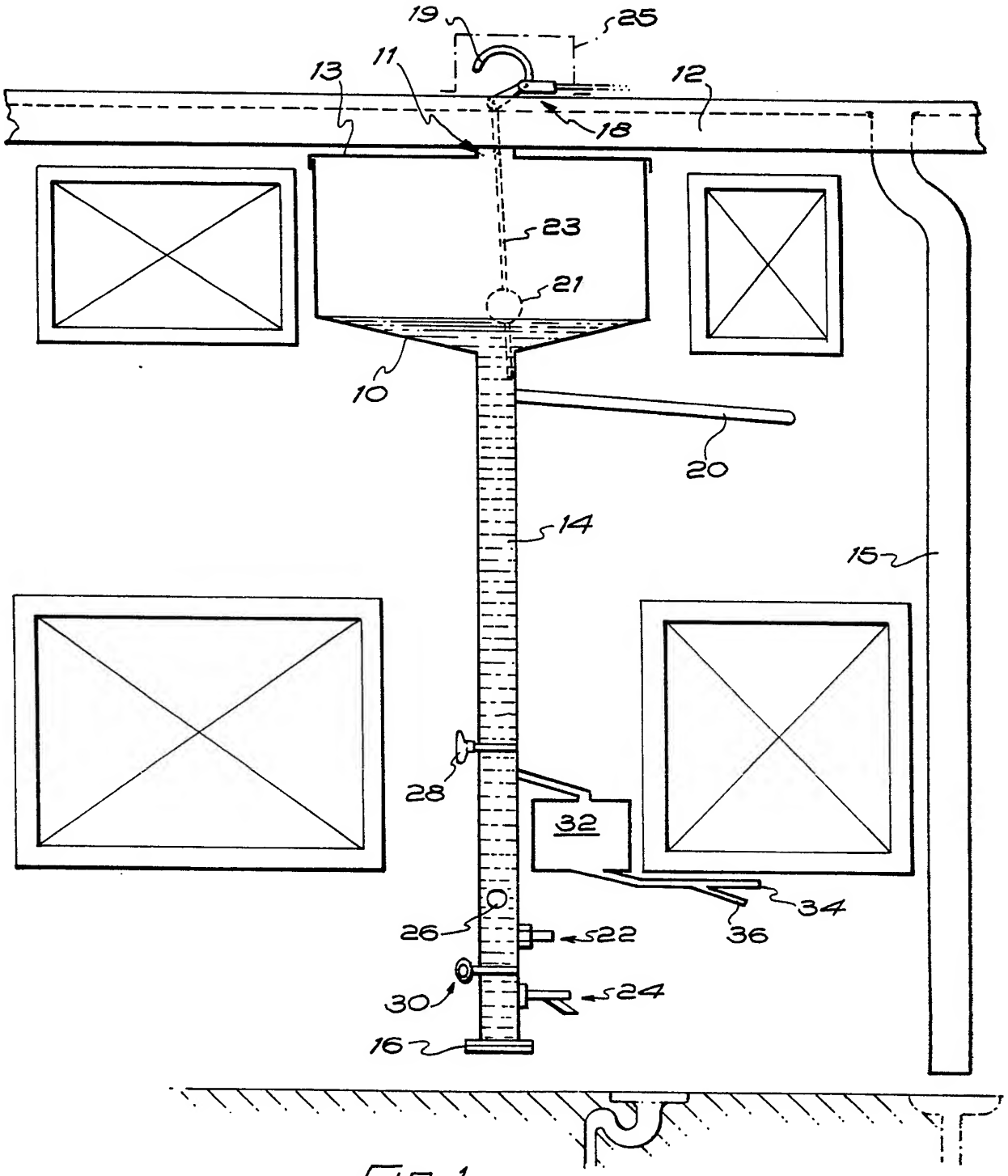

FIG. 1

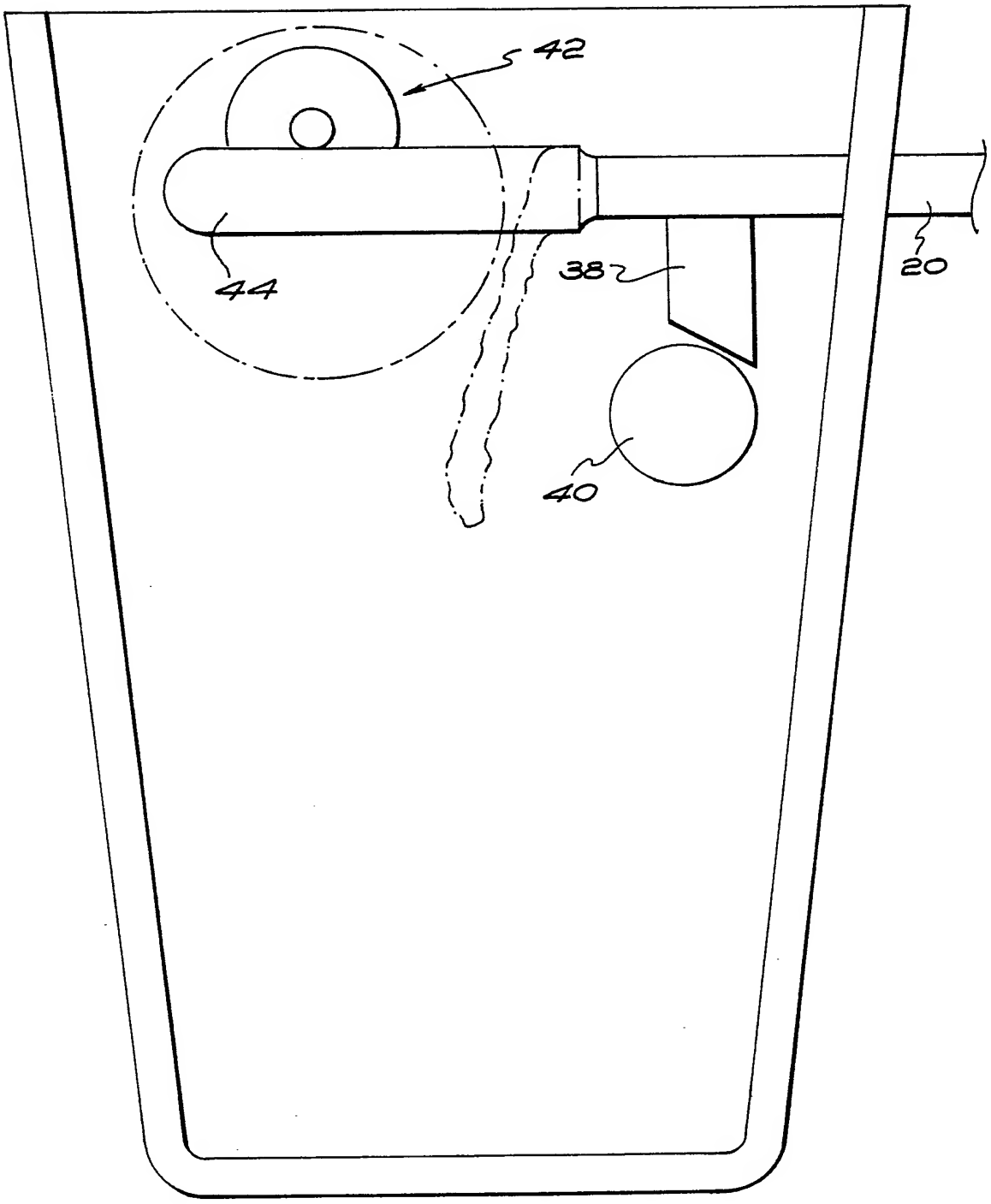

FIG. 2

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Rainwater catchment apparatus.

The invention relates to rainwater catchment apparatus for installation in either domestic or industrial buildings.

There are various water requirements which could quite well be fulfilled by the use of rainwater rather than water from the mains. For example, the water required to flush the toilet in a dwelling house could quite well be rain water rather than mains water. Similarly, the water used in many industrial buildings could in many instances be rain water. There are relatively few cases where the water supply must be absolutely clean for the purpose for which it is required, these being mainly where the water is required for human consumption or is required in the production of foodstuffs. The cost of mains water, which in many areas is now supplied on a metered basis and charged for according to the amount used, is very high indeed. If rainwater can be used for non-critical purposes, very substantial cost savings can be made.

Rainwater has of course been used previously for various purposes but has usually been gathered in water butts to be ladled out as and when required.

The drawback with this is that if the water butt becomes empty before a heavy shower of rain is able to fill it up, there is no supply of water whatever. The object of the invention is to provide rainwater catchment apparatus for fitment in a modern dwelling house or in commercial premises which will require no attention but which will utilize a supply of rainwater when available and revert back to the use of a mains supply when a rainwater reservoir has become used up.

According to the invention, there is provided rainwater catchment apparatus including a water tank capable of receiving rainwater from the roof guttering of a building and a float valve set so that it operates only when the level of water in the tank is exceptionally low and ceases to operate when the level of water in the tank exceeds a pre-determined, but still relatively low, minimum depth, the arrangement being such that non-critical uses of water can be supplied from said tank, usually by rainwater, but whereby any shortage of rainwater will be made up by mains water through the float valve, means being provided so that back syphonage of water from the tank into the mains supply can never occur. The means provided to ensure that back syphonage of water from the tank

into the mains supply can never occur may be constituted by the fact that the delivery of mains water through the float valve involves the free fall of water from a valve outlet at a point higher than the side walls of the water tank. The water tank will preferably have a sloping bottom to discourage silting. The water tank will preferably be a closed top tank connected into a length of roof guttering above it, the arrangement being such that when the water tank and the length of roof guttering above it are full of rain water an overflow is able to take place down a fall pipe to a soak away, the float valve in this case being positioned so that there is a free fall of water from said valve outlet at a point higher than the highest level of water in the roof guttering. A fall pipe may be connected into the bottom of the water tank, a lower end of said fall pipe being blanked off. The fall pipe connected into the bottom of the water tank will preferably be provided with a number of take-off connections through which water can be drawn from said tank. One of said take-off connections may lead to a water filtration tank, supply pipes leading from the latter for the supply of water to such uses as a kitchen sink and/or a domestic washing machine.

In order that the invention may be fully understood and readily carried into effect, the same will now be described, by way of example only, with reference to the accompanying drawings, of which:-

Figure 1 is a semi-diagrammatic illustration of an installation embodying the invention in a dwelling house, and

Figure 2 is a diagrammatic illustration of an automatic valve forming part of the installation of Figure 1.

Referring now to Figure 1, the installation there illustrated is built into a dwelling house and includes a water tank 10 located immediately below the guttering 12 into which rainwater can flow from the roof tiles. As shown, the water tank is a closed top tank and is connected into the length of roof guttering above it by way of a short length of pipe 11 with leak proof joints in its connections into the length of roof guttering and into the cover 13 for the water tank. The cover 13 is a leak proof fit around the top edge of the water tank. The tank has a sloping bottom, as shown, to discourage silting. An overflow arrangement is provided so that when the tank 10 and the guttering above it are full of rain water a flow of

water down a conventional fall pipe 15 to a soa-away takes place. The overflow arrangement is indicated 17 in Figure 1 and is constituted by the fact that the fall pipe 15 extends upwards through a hole in the bottom of the length of guttering 12 to a substantial depth within said guttering. A leak-proof joint 19 surrounds the fall pipe 15 where it extends through the bottom of the length of guttering. Connected into the bottom of the tank 10 is a fall pipe 14 the lower end of which is provided with a screw cap 16 a short distance above ground level.

As shown, a float valve 18 is positioned over the length of roof guttering and an outlet pipe 19 therefrom is such that there is a free fall of water from its outlet end at a point higher than the highest level of water in the roof guttering. In this way it is ensured that there can never be a back syphonage of water from the roof guttering into the mains supply.

The float valve 18 is controlled by a float 21 on a rod 23 which extends downwards into the tank 10 through the length of pipe 11. Under normal circumstances the float will be submerged beneath the water in the tank and will hold the float valve closed. However, when the water in the tank

reaches a very low level, the float valve is caused to open and water from the mains feeds the tank to maintain a minimum level of water in the tank.

The water in the tank 10 can be used for certain non-critical purposes only, that is to say for the flushing of a W/C, for watering the garden etc. Thus it will be seen that a supply pipe 20 leads from the fall pipe 14 immediately below the tank, this being for the feeding of water from the tank 10 to a flushing tank in a W/C. At a lower end of the fall pipe there is located a socket 22 for a garden hose (not shown) and a tap 24. Also located near the bottom of the fall pipe is a capacity meter 26, which can display the head of water available in the system, and shut-off valves 28 and 30.

A water filtration tank 32 is connected to the fall pipe and has supply pipes 34 and 36 leading from it for the supply of water to a kitchen sink and to a washing machine (not shown).

The arrangement is such that whenever there is a sufficient head of rain water in the tank 10 the various 'non-critical' uses of water of the kind referred to above, that is to say for the flushing of the W/C, the watering of the garden, the supply

of water to the washing machine and kitchen sink, can all be supplied by the use of rainwater. Whenever the level of rainwater is very low, mains water is used automatically to feed the water tank 10 so that there is no interruption in the supply to the various non-critical uses.

The system has various other features. For example, it will be observed that the tank 10 has a sloping bottom surface. This is to prevent silting.

The system can be expected to require flushing out from time to time because a certain amount of silt and grit will be washed into the system from the house roof. The build up of silt and grit in the fall pipe can be flushed out from time to time by the removal of the screw cap 16 and the appropriate control of the shut-off valves 28 and 30.

Various modifications could be made. For example, the system could have more than one tank 10 for the storage of rainwater. If preferred, each tank could be arranged to feed a particular non-critical use.

The roof guttering may of course be covered by wire-mesh to prevent the entry of larger items of debris, such as pieces of broken roof tiles, into

the rainwater utilising system. It will be preferable for the float valve to be protected from the elements by being enclosed within some kind of cover. Such a cover is shown at 25 in Figure 1 to be mounted on the length of roof guttering.

There is no possibility of the rainwater getting into the mains supply. Consequently, there can be no health hazard with a system as proposed.

In Figure 2 there is illustrated a form of water tank for a rainwater fed W/C flushing system. A supply pipe 20 from the rainwater tank enters the tank, as shown and communicates with a discharge tube 38. A flotation ball 40 is provided for closing the discharge tube when the tank is full of water.

A conventional ball valve 42 is provided for feeding the tank with mains water if the supply of water from the tank 10 fails, for example due to freezing in cold weather. A closed ended length of flexible tube 44 is provided for normally holding the ball valve arm in its raised position. A head of water in the rainwater supply pipe 20 causes the length of flexible tube to project as shown in semi-rigid condition. A lack of rainwater in the pipe 20 will allow the length of flexible tube to droop which will thus allow the ball valve to open.

Thus there is provided a rainwater catchment apparatus which it is thought will be advantageous for either domestic or industrial application. With the introduction of metered supplies of water, it is thought that the use of such apparatus can be expected to result in considerable financial savings both for householders and for the owners of industrial premises.

CLAIMS:

1. Rainwater catchment apparatus including a water tank capable of receiving rainwater from the roof guttering of a building and a float valve set so that it operates only when the level of water in the tank is exceptionally low and ceases to operate when the level of water in the tank exceeds a pre-determined, but still relatively low, minimum depth, the arrangement being such that non-critical uses of water can be supplied from said tank, usually by rainwater, but whereby any shortage of rainwater will be made up by mains water through the float valve, means being provided so that back syphonage of water from the tank into the mains supply can never occur.

2. Rainwater catchment apparatus according to claim 1, in which the means provided to ensure that back syphonage of water from the tank into the mains supply can never occur are constituted by the fact that the delivery of mains water through the float valve involves the free fall of water from a valve outlet at a point higher than the side walls of the water tank.

3. Rainwater catchment apparatus according to either one of the preceding claims, in which the

water tank has a sloping bottom to discourage silting.

4. Rainwater catchment apparatus according to any one of the preceding claims, in which the water tank is a closed top tank connected into a length of roof guttering above it, the arrangement being such that when the water tank and the length of roof guttering above it are full of rain water an overflow is able to take place down a fall pipe to a soak-away, the float valve in this case being positioned so that there is a free fall of water from said valve outlet at a point higher than the highest level of water in the roof guttering.

5. Rainwater catchment apparatus according to any one of the preceding claims, in which a fall pipe is connected into the bottom of the water tank, a lower end of said fall pipe being blanked off.

6. Rainwater catchment apparatus according to claim 5, in which the fall pipe connected into the bottom of the water tank is provided with a number of take-off connections through which water can be drawn from said tank.

7. Rainwater catchment apparatus according to claim 6, in which one of the take-off connections leads to a water filtration tank, supply pipes

leading from the latter being for the supply of water to such uses as a kitchen sink and/or a domestic washing machine.

8. Rainwater catchment apparatus, constructed, arranged and adapted to be used substantially as hereinbefore described with reference to and as illustrated by the accompanying drawings.

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ABSTRACT:

Rainwater catchment apparatus including a tank (10) for receiving rainwater from the roof of a

building.

The water tank is a closed top tank so that any shortage of rainwater will be made up by mains water, the tank is provided with a float valve (21) the outlet from which is at a point higher than the side walls of the roof guttering. □